

**Remarks**

Claims 1-20 are pending herein. Claims 1-7 and 14-18 have been withdrawn as being directed to a non-elected invention.

In the Office Action, claims 8-10, 12 and 13 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 3,960,774 to Rosback ("Rosback") in view of U.S. Patent 3,558,732 to Neuzil et al. ("Neuzil") and U.S. Patent 5,919,287 to Moreau ("Moreau") or U.S. Patent 6,652,626 to Plee ("Plee"); and claim 11 is rejected under 35 U.S.C. §103(a) as being unpatentable over Rosback and Neuzil, Moreau or Plee further in view of U.S. Patent 4,642,406 to Schmidt ("Schmidt").

In view of the remarks herein, Applicants respectfully request reconsideration and withdrawal of the rejections set forth in the Office Action.

**I. Rejection of Claims 8-10, 12 and 13**

Claims 8-10, 12 and 13 are rejected under 35 U.S.C. §103(a) as being unpatentable over Rosback in view of Neuzil and Moreau or Plee.

Rosback is cited for disclosing a process for separating para-xylene from a mixture of C<sub>8</sub> aromatic hydrocarbons by contacting the mixture with an adsorbent comprising zeolite X with a silica/alumina ratio of about 2.5.

The Office Action notes that Rosback does not disclose the step of clay undergoing zeolitization. Moreau and Plee are cited for disclosing a process for converting a clay binder into a zeolite wherein the binder is selected from the group consisting of kaolinite. According to the Office Action, it would have been obvious to have modified the Rosback process by converting the binder into zeolite as taught by either Moreau or Plee because Plee discloses that it is advantageous to convert the binder into zeolite.

Applicants respectfully submit that it would not have been obvious to modify the Rosback process in view of Moreau or Plee to include the step of converting a clay binder into zeolite.

As noted in the Office Action, the adsorbent taught in Rosback is used to separate para-xylene from C<sub>8</sub> aromatic hydrocarbons. The starting material used to prepare the Rosback adsorbent comprises a type X or type Y zeolite and an amorphous material as a binder. The amorphous binder is amorphous silica and/or alumina. With respect to the properties such adsorbent must have to be effective in the process disclosed therein, Rosback teaches the following:

With the type of processes employing adsorbents to separate para-xylene now in mind, one can appreciate that certain characteristics of adsorbents are highly desirable, if not absolutely necessary, to the successful operation of the selective adsorptive process. Among such characteristics are: adsorptive capacity for some volume of para-xylene per volume of adsorbent; adsorption for para-xylene with respect to the other C<sub>8</sub> aromatic isomers and the desorbent; and sufficiently fast rates of adsorption and desorption of the paraxylene to and from the adsorbent.

Thus, to be effective in the Rosback process, the adsorbent must have properties that are specific to the ability to adsorb para-xylene from C<sub>8</sub> aromatic hydrocarbon compounds.

Neither Moreau nor Plee are directed to adsorbing para-xylene.

Moreau is directed to the treatment of solutions of lithium salts contaminated with metallic cations, permitting complete elimination of the metallic impurities. Specifically, the Moreau adsorbent is used to adsorb metallic cations other than lithium.

Plee is directed to adsorbents for separation of industrial gases, more particularly for the separation of nitrogen by adsorption in gas flows, such as air, and the purification of hydrogen by adsorption of CO and/or N<sub>2</sub>. The Plee adsorbent is used to adsorb nitrogen or CO.

In both the Moreau and Plee adsorbent-manufacturing processes, a clay binder is converted into zeolite. Moreau does not disclose any specific advantages associated with the conversion of the clay binder into zeolite. Plee teaches that conversion of a binder, in

all or in part, into zeolite is one way to overcome the “disadvantage of the binder being inert with respect to adsorbing performances” (col. 2, lines 48-51). However, Plee does not disclose the effect of such conversion on “adsorbing performances” relative to para-xylene/C<sub>8</sub> aromatic hydrocarbon separation but rather relative to nitrogen/oxygen separation and nitrogen-carbon monoxide/hydrogen separation. Neither Moreau nor Plee teaches or suggests the effect the conversion of clay binder into zeolite would have on the resulting adsorbent’s ability to adsorb para-xylene from a mixture of C<sub>8</sub> aromatic hydrocarbon compounds.

Thus, Applicants submit that one skilled in the art, reviewing Moreau and Plee, would not be motivated to use in Rosback a clay binder which has been converted into zeolite.

In fact, Applicants submit that one skilled in the art, reviewing not only Moreau and Plee but also Neuzil, would not be motivated to use a clay binder, whether converted to zeolite or not, in the Rosback process. Neuzil discloses adsorbents for separating para-xylene from aromatic hydrocarbon compounds. However, this reference does not use a binder. Thus, the only secondary reference cited which is directed to adsorbents for separating para-xylene from aromatic hydrocarbon compounds does not teach the use of a binder. Applicants submit that one skilled in the art would look more to the teachings of Neuzil than to the teachings of Moreau and Plee to determine what modifications might be made to the Rosback process because Rosback and Neuzil are each directed to the same purpose. Applicants submit that since Neuzil does not teach the use of a binder, one skilled in the art would not be motivated to convert the binder in Rosback into a zeolite even though such conversion is taught in Moreau and Plee. Applicants submit that one skilled in the art would be lead by the references to believe that some separation processes (e.g., the Moreau and Plee separation processes) require a converted clay binder and some (e.g., the Neuzil separation process) do not even require a binder.

Thus, for at least the foregoing reasons, Applicants respectfully submit that claims 8-10, 12 and 13 would not have been obvious over Rosback in view of Neuzil and Moreau or Plee.

## **II. Rejection of Claim 11**

Claim 11 is rejected under 35 U.S.C. §103(a) as being unpatentable over Rosback and Neuzil, Moreau or Plee further in view of Schmidt.

Applicants submit that claim 11, which ultimately depends upon claim 8, would not have been obvious over Rosback, Moreau or Plee further in view of Schmidt for the same reasons that claims 8-10, 12 and 13 would not have been obvious over Rosback in view of Neuzil and Moreau or Plee. Specifically, the secondary references would not have made it obvious to modify the Rosback process to include the step of converting a clay binder into zeolite.

## **III. Conclusion**

In view of the foregoing remarks, Applicants respectfully requests that the rejections set forth in the Office Action be withdrawn and that claims 8-13, 19 and 20 be allowed.

Respectfully submitted,



Frederick F. Calvetti, Reg. No. 28,557

Date: October 22, 2004

SMITH, GAMBRELL & RUSSELL, LLP  
1850 M Street, NW - Suite 800  
Washington, D.C. 20036  
Tel: 202 263 4300  
Fax: 202 263 4329

215036